

# ABSTRACT

A method of establishing a multicast transfer route is disclosed that can reduce the cost of entire route under a constraint on delay incurred between  
5 starting point and ending points. The method includes the steps of: computing the shortest route with respect to delay connecting the starting point and the plural ending points based on measurement result; computing delay from a node on the shortest route to each ending point and the  
10 greatest delay; removing, if the greatest delay satisfies a delay condition, the greatest-cost route from the shortest route in accordance with selection criteria effective for cost reduction; dividing the multicast transfer route into two route trees; and establishing  
15 separately computed route as a complementary route that complement the removed route for connecting the two route trees. A method of multicast label switching for realizing the above method is also disclosed. A multicast label switching route is established using hierarchical  
20 labels by establishing a common multicast label switching route using a first layer label and establishing plural partial multicast label switching routes for subgroup destinations using lower layer labels. A relay node recognizes the hierarchical labels thereby to label-switch  
25 using all hierarchical labels.

28 JAN 2005

(19) 世界知的所有権機関  
国際事務局



(43) 国際公開日  
2004 年 8 月 19 日 (19.08.2004)

PCT

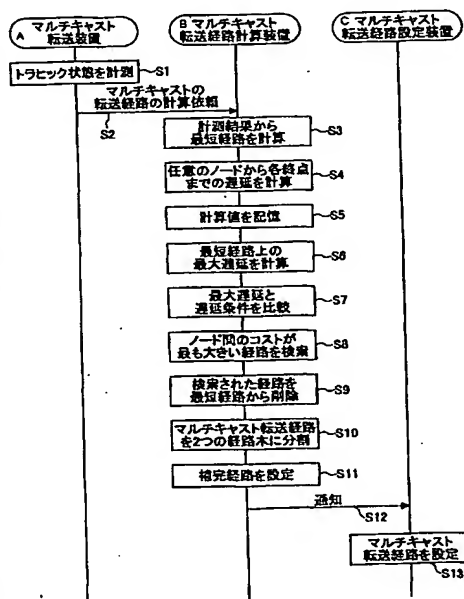
(10) 国際公開番号  
WO 2004/071032 A1

- (51) 国際特許分類: H04L 12/56
- (21) 国際出願番号: PCT/JP2004/001246
- (22) 国際出願日: 2004 年 2 月 6 日 (06.02.2004)
- (25) 国際出願の言語: 日本語
- (26) 国際公開の言語: 日本語
- (30) 優先権データ:  
特願2003-031605 2003 年 2 月 7 日 (07.02.2003) JP  
特願2003-038782 2003 年 2 月 17 日 (17.02.2003) JP
- (71) 出願人 (米国を除く全ての指定国について): 日本電信電話株式会社 (NIPPON TELEGRAPH AND TELEPHONE CORPORATION) [JP/JP]; 〒1008116 東京都千代田区大手町二丁目 3 番 1 号 Tokyo (JP).
- (72) 発明者; および
- (75) 発明者/出願人 (米国についてのみ): 安川 正祥 (YASUKAWA, Seisho) [JP/JP]; 〒1808585 東京都武蔵野市緑町 3 丁目 9-11 NTT 知的財産センタ内 Tokyo (JP). 杉園 幸司 (SUGISONO, Koji) [JP/JP]; 〒1808585 東京都武蔵野市緑町 3 丁目 9-11 NTT 知的財産センタ内 Tokyo (JP). 宇賀 雅則 (UGA, Masanori) [JP/JP]; 〒1808585 東京都武蔵野市緑町 3 丁目 9-11 NTT 知的財産センタ内 Tokyo (JP).
- (74) 代理人: 伊東 忠彦 (ITO, Tadahiko); 〒1506032 東京都渋谷区恵比寿 4 丁目 20 番 3 号 恵比寿ガーデンプレイスタワー 3 2 階 Tokyo (JP).
- (81) 指定国 (表示のない限り、全ての種類の国内保護が可能): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR,

[続葉有]

(54) Title: MULTICAST TRANSFER ROUTE SETTING METHOD, AND MULTICAST LABEL SWITCHING METHOD FOR IMPLEMENTING FORMER METHOD

(54) 発明の名称: マルチキャスト転送経路設定方法、及びそれを実現するためのマルチキャストラベルスイッチング方法



A...MULTICAST TRANSFER DEVICE  
B...MULTICAST TRANSFER ROUTE CALCULATION DEVICE  
C...MULTICAST TRANSFER ROUTE SETTING DEVICE  
S1...MEASURE TRAFFIC STATE  
S2...ASK FOR CALCULATION OF MULTICAST TRANSFER ROUTE  
S3...CALCULATE SHORTEST ROUTE ON THE BASIS OF MEASUREMENT RESULT  
S4...CALCULATE DELAYS FROM GIVEN NODE TO END POINTS  
S5...STORE CALCULATED VALUES  
S6...CALCULATE MAXIMUM DELAY ON SHORTEST ROUTE  
S7...COMPARE MAXIMUM DELAY WITH DELAY CONDITION  
S8...SEARCH FOR ROUTE WITH HEAVIEST COST BETWEEN NODES  
S9...EXCLUDE SOUGHT ROUTE FROM SHORTEST ROUTES  
S10...DIVIDE MULTICAST TRANSFER ROUTE INTO TWO ROUTE TREES  
S11...SET SUPPLEMENT ROUTE  
S12...NOTIFICATION  
S13...SET MULTICAST TRANSFER ROUTE

(57) Abstract: A multicast transfer route setting method wherein the shortest route in terms of delay time out of the routes from a starting point to end points is determined by calculation, the delays from a give node on the shortest route to the end points and the maximum delay are calculated, the maximum cost route is excluded from the shortest route according to a selection criterion effective in reducing the cost of the overall tree if the maximum delay meets the delay condition, the multicast transfer route is divided into two route trees, another route determined by calculation is set as a supplement route for the excluded route to interconnect the tow route trees. When a multicast label switching route is set, a shared multicast label switching route is set through a first layer label of the hierarchical labels and partial multicast label switching routes addressed to a sub-group in a lower layer. A relay node judges hierarchical labels to carry out label switching of all the hierarchical labels.

[続葉有]

WO 2004/071032 A1